

REMARKS

Upon entry of this Amendment, claims 30-61 are all the claims pending in the application. Claims 60 and 61 have been added. Claims 30-59 presently stand rejected. In particular, claims 31, 35-37, 42-44, 48-53, 58 and 59 are rejected under 35 U.S.C. § 112, second paragraph; claims 30-33, 35, 37-41 and 45-59 are rejected under 35 U.S.C. § 102(b) as being anticipated by Byron et al. (USP 4,847,843); and claims 34, 36 and 47 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Byron et al.

For the reasons set forth below, Applicants respectfully traverse the rejections of claims 30-59 and request favorable disposition of the application.

Claim Rejection under 35 U.S.C. § 112, second paragraph

Claims 31, 35-37, 42-44, 48-53, 58 and 59 are rejected under 35 U.S.C. § 112, second paragraph.

In regard to the rejection of claims 31 and 35, Applicant submits that a skilled artisan would understand how to acoustically dampen the fiber spool. For example, as disclosed in the present specification, enclosing the fiber spool within an enclosure would provide a dampening effect.

In regard to the rejection of claim 36, Applicant submits that a sufficient description of “holding to zero a time-averaged cavity length mismatch of the fiber” is provided at least at paragraph number [0109] of the published application (United States Patent Application 20020097761). For example, it is disclosed that “it is necessary to use a servo loop to hold the time-averaged repetition rate to γ_1 ; or equivalently, the time-averaged cavity length mismatch,

ΔL , must be held to zero. The feedback signal which can be used to control the average cavity mismatch is derived from a pair of photodetectors PD-1 and PD-2 shown in FIG. 9, which feed into a conventional phase locked loop (PLL) circuit.”

In regard to the rejection of claim 37, Applicant submits that a sufficient description of “co-wrapping the two fiber lasers on a single fiber spool” is provided at least at paragraph number [0078] of the published application (United States Patent Application 20020097761). For example, in reference to Fig. 4, it is disclosed that “[t]he lasers are thermally and mechanically coupled by co-wrapping them on the same fiber spool 280.” The Examiner asserts that without reciting any other steps, the claim is indefinite. However, Applicant intends here to claim only the step of wrapping both of two fiber lasers around the same single spool for the purpose of reducing timing jitter between the two fiber lasers. Applicant submits that providing additional operational steps would limit the claim to less than the Applicant’s invention.

In regard to the rejection of claims 42-44, 48-52, 58 and 59, Applicant respectfully submits that a skilled artisan would understand, at least after reading the specification, that the claimed piezoelectric device can alter the repetition rate of the laser in several ways. For example, according to one embodiment disclosed in the specification the piezoelectric device can alter the repetition rate by changing the length of the laser cavity. (See, e.g., par. 0049 of the published application). Additionally, according to another embodiment, the piezoelectric device can alter the repetition rate by controlling movement of mirrors. (See, e.g., par. 0050 of the published application).

In regard to the rejection of claim 53, Applicant has amended claim 53 as outlined above. Applicant submits that claim 53 satisfies all requirements of 35 U.S.C. §112.

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For the reasons set forth above, Applicant submits that each of claims 31, 35-37, 42-44, 48-53 and 58-59 satisfy the requirements of 35 U.S.C. § 112 and requests that the rejection of these claims under § 112, second paragraph, be withdrawn. Furthermore, since no prior art rejections have been asserted against any of claims 42-44, Applicant requests that these claims be found to contain allowable subject matter.

Claim Rejection under 35 U.S.C. § 102

Claims 30-33, 35, 37-41 and 45-59 are rejected under 35 U.S.C. § 102(b) as being anticipated by Byron et al. (USP 4,847,843).

Byron et al. is directed to color center fiber lasers and, in particular, to an apparatus including a length of halide glass optical fiber (i.e., a color center laser fiber), a means for cooling the fiber laser to a working temperature (e.g., 77° K) and a means for coupling an optical pumping signal into an end of the fiber. (Col. 1, lines 31-36). Byron et al. does not teach or suggest a short-pulse fiber laser, as expressly recited in each of claims 30-40 and 53-59.

Moreover, in Bryon, the fiber is cooled in order to get to the working temperature of the color centers. Color-center materials do not have gain at room temperature. The present invention is not directed to temperature cooling a fiber. One of the objectives of the present invention is temperature controlling the fiber to control the fiber length and, thus, stabilize short pulses. The fiber can be hot or cold or room temperature.

A “short-pulse” fiber laser has a specific meaning in the art and the present application discloses and claims devices and methods used to stabilize this type of fiber laser. Since Byron et al. makes no mention of “short pulse” lasers, Byron et al. does not, and can not, anticipate any

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of claims 30-40 and 53-59. Accordingly, applicant respectfully requests that the §102 rejection of claims 30-33, 35, 37-40 and 53-59 be withdrawn.

In regard to the §102 rejection of claim 41, Applicant submits that Byron et al. fails to teach “adjusting the length of a cavity of the fiber laser in response to changes in environmental conditions”, as explicitly recited. In fact, the Examiner has not even attempted to demonstrate where in the asserted prior art reference this feature is disclosed. Accordingly, Applicant requests the withdrawal of the rejection of claims 41-44.

In regard to the §102 rejection of claim 45, Applicant submits that claim 45 recites subject matter that is patentable over the cited prior art. In particular, Byron et al. fails to teach or suggest at least a rare-earth doped fiber, as required by the claim. To the contrary, Byron et al. discloses a very specific type of laser, i.e., a color-center laser, that is clearly not a rare-earth doped fiber. Byron et al., thus, does not anticipate claim 45. Accordingly, Applicant requests the withdrawal of the rejection of claims 45-52.

Claim Rejection under 35 U.S.C. § 103

Claims 34, 36 and 47 are rejected under 35 U.S.C. § 103 as being rendered obvious by Byron et al. (USP 4,847,843).

Claims 34 and 36 both depend from allowable claim 30, as discussed above, and claim 47 depends from allowable claim 45. Accordingly, the rejection of these three claims should be withdrawn for at least this reason and such action is kindly requested.

Additionally, however, Applicant submits that Byron et al. does not teach, or even suggest, the second fiber laser explicitly recited in each of claims 34, 36 and 47. The Examiner asserts that the second fiber laser recited in the present claims is obvious “since it has been held

that mere duplication of the essential working parts of a device involves only routine skill in the art.” Applicant submits, however, that the disclosed and claimed second fiber laser is clearly more than a mere duplication of essential working parts. For example, as disclosed in the published specification at paragraph number [0112];

in order to be able to use a 30 Hz stabilizer bandwidth and still maintain synchronization with <10 psec accuracy, the intrinsic relative timing jitter of the laser pair must be very low. This is achieved using the methods of construction described earlier, which ensure that the two lasers are subjected to the same environmental conditions to the greatest extent possible.

Two of the many ways both disclosed and claimed in the present application to achieve the desired stability of the two fiber lasers are to co-wrap the fibers around the same spool and to drive the two fibers with the same single optical pump source. (See, e.g., claim 47). Therefore, the dual laser system recited in the claims of the present application, for example, in claims 34, 36 and 47, includes more than the “mere duplication” of a single fiber laser. Accordingly, Applicant requests withdrawal of the §103 rejection of claims 34, 36 and 47.

Patentability of New Claims

In regard to new claim 60, Applicant submits that claim 60 recites subject matter that is patentable over the cited prior art. In particular, Byron et al. fails to teach or suggest at least a fiber that is held near ambient temperature, as required by the claim. To the contrary, Byron et al. discloses a very specific type of laser, i.e., a color-center laser, that requires a low temperature, e.g., 77°K or below, to operate. (Abstract) Byron et al., thus, does not disclose the

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subject matter of claim 60 and, moreover, a skilled artisan presented with the problem addressed by the present invention would not even have consulted Byron et al. to derive a solution. Accordingly, Applicant requests that new claim 60 be found allowable over the cited prior art of record.

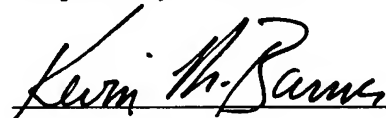
For the same reason claim 61, which requires a fiber that is held above ambient temperature, is not either anticipated or otherwise rendered obvious by the prior art of record.

Conclusion

In view of the foregoing amendments and remarks, the application is believed to be in form for immediate allowance with claims 30-61, and such action is hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, he is kindly requested to **contact the undersigned** at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

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